

INTRODUCTION

9.1 This chapter considers the transport impact of the proposals in terms of the local highways and transportation networks. The assessment focuses on the two major ways to and from the site, which ultimately allow access to the M5 motorway and surrounding highway network.

9.2 The first main way of accessing the site is via Stoke Orchard Road to the A435 and then northbound to the A46, which in turn provides direct access to the M5 at junction 9. This is the route generally used by traffic currently accessing the site from areas beyond Cheltenham and its immediate surrounds. The second main way of accessing the site is via the A435 southbound. Approximately 3km to the south the A435 enters the outskirts of Cheltenham, at a roundabout junction close to Cheltenham racecourse. From this point there are a number of different potential routes through Cheltenham with alternative access to the M5 possible via the A40 to junction 11. Traffic currently accessing the site from the south generally tends to be associated with waste generated from Cheltenham and its surroundings rather than further afield.

9.3 Whilst it is possible to travel west from the site along Stoke Orchard Road there is a weight restriction just to the west of the neighbouring Wingmoor Farm West Waste Management Facility site entrance designed to discourage freight routing in this direction.

STUDY AREA

9.4 Through discussions with Gloucestershire County Council (GCC) as highway authority, the study area for this assessment has been defined as Stoke Orchard Road from the site entrance to Wingmoor Farm West Waste Management Facility (located to the west of the proposals site) to its junction with the A435, and the A435 from the A46 junction in the north to the roundabout junction with the Cheltenham racecourse in the south. The A435 is the focus of the assessment partly due to its inclusion in the county recommended freight routes. The study area is shown on Figure 9.1.

9.5 The roads within the study area are mostly offset from residential and employment areas by means of a verge and or physical barrier (wall or hedgerow). There are no identifiable schools or churches along these roads. Schools and churches are found alongside roads within Cheltenham outside of the study area but as already discussed it is possible to travel through Cheltenham via

a number of different routes, thereby avoiding these sensitive receptors.

EXISTING ENVIRONMENT

9.6 The existing western vehicle entrance to the site is a priority T-junction with physical design constraints to prevent HGV access from the west. This entrance gives access to the existing hazardous waste operations and remaining mineral activities.

9.7 To the west of the western site entrance Stoke Orchard Road is approximately 6.3m wide with soft edges and 1-2m grass verges, with hedgerows located on the outer edges. The road generally follows the surrounding landform and passes over the Bristol to Birmingham main line railway via a brick arched bridge, situated approximately 800 metres west of the western site entrance. The carriageway to the west of the western site entrance is of a tarmac construction and in good condition.

9.8 Forward visibility along Stoke Orchard Road in this area is considered adequate but does reduce within the vicinity of the railway bridge. There is an access road directed off Stoke Orchard Road that leads to Wingmoor Farm West Waste Management Facility, a Household Waste Recycling Centre (HWRC) and the Park Waste Management facilities. This access road is located approximately 150m to the west of the railway bridge and marks the western extent of the study area.

9.9 The existing eastern site entrance is a priority T-junction with a triangular bell-mouth measuring approximately 30 metres across at the edge of the highway. HGV access is possible through this entrance from both the east and west. This entrance currently provides access to the non-hazardous waste operations and Material Recovery Facility (MRF).

9.10 Stoke Orchard Road east of the eastern site access is approximately 6.3m wide with kerbed edges, 1m grass verges and hedgerows located on both sides of the carriageway. The road is subject to the national speed limit to the west of the eastern site access junction, with no street lighting. To the east of the eastern entrance the road is subject to a 40mph speed limit. Visibility from the eastern site access accords with the requirements of the speed limits in place.

9.11 Located to the immediate east of the eastern site access is an access junction to North Cheltenham Rugby Club. Street lighting is not present at the access junction

to the rugby ground. The rugby club is not normally in use during the current operational hours of the site. However, there is potential for it to be used when the site is in operation and it may also provide a destination for pedestrians and cyclists from the adjacent residential estate. Therefore in terms of this assessment it has been identified as the only sensitive receptor.

9.12 Located approximately 185m east of the rugby club access on the northern side of the carriageway, is an access junction to Malvern View Business Park via the road Stella Way. Two further accesses are located on the north side of the carriageway between Stella Way and the rugby ground providing access to a variety of industrial buildings. Street lighting begins 115m east of the rugby club entrance and continues east along Stoke Orchard Road to the junction with the A435.

9.13 There is a residential estate located to the north of Stoke Orchard Road, the western edge of which is within 315m of the eastern site entrance. This estate is accessed via three T junction accesses off Stoke Orchard Road. The most westerly (Stoke Road) runs directed northeast off Stoke Orchard Road and acts as a main road through the estate linking into the A435 to the north of the Stoke Orchard Road / A435 roundabout. The other two accesses (Farriers Reach and Lyndley Chase) are cul-de-sac roads providing access to residential dwellings. All of these accesses are considered to conform to normal junction standards, with visibility through these junctions also considered to be adequate.

9.14 A pedestrian footway runs along the northern side of Stoke Orchard Road from the roundabout junction on the A435 to a point approximately 200m east of the eastern site access. There are no designated cycle facilities in the immediate vicinity of the site, but on road cycling is possible with good forward visibility along Stoke Orchard Road and good access to nearby residential areas.

9.15 Within the study area the A435 consists of a north - south primary route connecting Cheltenham to the south to the A46 at Teddington to the north. It is mainly 7.3 metres in width between the Racecourse junction and the roundabout with the A46. The road is subject to a speed limit of 60mph from the Racecourse junction to a point just south of the Bishop's Cleeve Bypass, within Bishop's Cleeve the speed limit is 40mph and to the north of Bishop's Cleeve to the junction with the A46 it reverts back to 60mph. A number of major junctions are located along the route as described briefly below and shown on Figure 9.3.

- Junction 1 – 5 arm roundabout 50 metres in diameter providing access to Cheltenham Racecourse
- Junction 2 - Traffic signal controlled crossroads connecting Hyde Lane and Southam Lane to the A435
- Junction 3 – 4 arm roundabout 45 metres in diameter at the southern end of the Bishops Cleeve Bypass
- Junction 4 - 4 arm roundabout 40 metres in diameter at the mid point of the Bishops Cleeve Bypass connecting with Stoke Orchard Road and Voxwell Lane.
- Junction 5 - 4 arm roundabout 40 metres in diameter towards the northern end of the Bishops Cleeve Bypass connecting with Hayfield Way and Finlay Way.
- Junction 6 - 5 arm roundabout 80 metres in diameter connecting the A435 to the A46. Known as Teddington Hands roundabout.

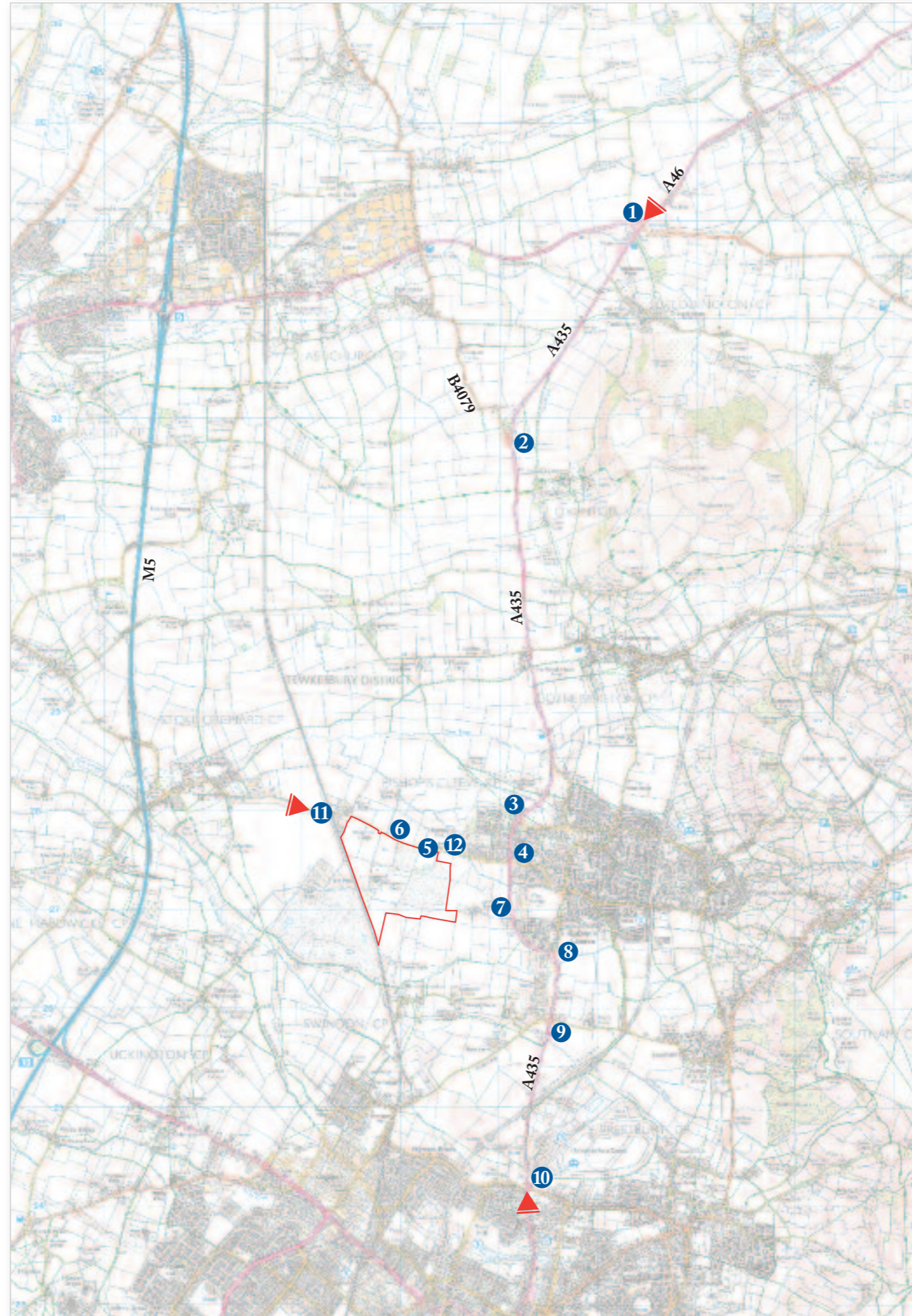


Figure 9.1 : Study Area and Traffic Survey Locations

- The Site
- ▶◀ Extent of Study Area
- ① A46/A435 junction
- ② A435/B4079 junction
- ③ A435/Hayfield Way/Finlay Way junction
- ④ A435/Stoke Orchard Way/Voxwell Lane junction
- ⑤ Eastern Site Access
- ⑥ Western Site Access
- ⑦ Evesham Road between junctions 4 and 8
- ⑧ A435/Miles Road/Cheltenham Road junction
- ⑨ A435/Hyde Lane/Southam Lane junction
- ⑩ A435 and Racecourse entrance junction
- ⑪ Access to Wingmoor Farm West Waste Management Facility
- ⑫ Access to Malvern Business Centre



Source. Peter Brett Associates

Scale. 1:50 000

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SCOPE, METHODOLOGY, ASSUMPTIONS AND LIMITATIONS

9.16 The assessment undertaken has had regard to guidance contained within 'Guidance on Transport Assessment' (DfT, 2007) and 'Guidelines for the Environmental Assessment of Road Traffic' (Institute of Environmental Assessment, 1993).

9.17 The DfT guidance recommends that the capacity of the transport network be assessed for the opening year of the development and one or two further assessment years. It has been agreed with GCC to assess the potential impacts of the development at:

- opening year of 2009;
- 5 years beyond the opening year at 2014, and
- 15 years beyond the opening year at 2024 when the site is approaching final restoration.

9.18 Potential impacts of the proposals have been identified and assessed against both the 'do nothing' and the 'minimum engineered scheme (MES)' scenarios described in Chapter 7. Based on the present annual tonnages being brought into the site it is likely that the MES would take around 10 years to complete and would

therefore still be in operation in 2014. By 2024 the MES would be complete and at this point in time the MES scenario would therefore be equivalent to the do nothing scenario.

9.19 The key assumptions made in the assessment is that the annual tonnage of material to be generated by the proposals will be:

- 142,546 tonnes of non-hazardous waste up to early 2029;
- 62,764 tonnes of hazardous waste up to early 2027;
- 7,067 tonnes of exported sand and gravel up to the end of 2014; and
- 38,400 tonnes of exported clay up to mid 2026.

9.20 The Materials Recovery Facility (MRF) is predicted to take up to 50,000 tonnes of material per year over the lifetime of the site (i.e. to the end of 2028). The traffic assessment has assumed that of this 50,000 tonnes, 37,500 tonnes (75%) would be recycled and moved off site and 12,500 tonnes (25%) would be disposed of in the non-hazardous landfill area on site.

9.21 In respect of the MES it is assumed that the same annual level of hazardous waste would be imported with non-hazardous waste reduced to 98,070 tonnes per year. The MRF is assumed to operate as it would under the proposals. Based on the physical constraints of the MES it is considered that this option would take around 10 years to complete. No exports of sand, gravel and clay would occur under the MES. For both the proposals and the MES approximately 500 tonnes of clinical waste would also be stored at the site.

9.22 Further details on the figures for both the proposals and the MES are provided in Chapters 3 and 7. The tonnages quoted above are taken to be the maximum levels that would be accepted in any one year. Traffic flows generated by the proposed development and the MES as a result of these tonnage figures have been predicted on the basis of trip rates derived from the existing use of the site.

Existing Traffic Information

9.23 In order to undertake the assessment it has been necessary to determine the existing situation in respect of traffic within the study area. In this regard traffic surveys undertaken by GCC at most of the major junctions along the A435 within the study area during June / July 2007 were obtained. Although the data is of sufficient quality to use in junction capacity assessments it does not identify the traffic directly attributable to the current operations of

Table 9.1: Summary of Available Traffic Data

No.	Junction	Date of Survey	Count Type
1	A46 / A435	July 2006	One-way link flows
2	A435 / B4079	June 2007	Classified turning count
3	A435 /Hayfield Way /Finlay Way	June 2007	Classified turning count
4	A435 /Stoke Orchard Way/ Voxwell Lane	Sep 2008	Classified turning count 12 hour
5	Eastern site access	Sep 2008	Weighbridge data and classified count 12 hour
6	Western site access	Sep 2008	Weighbridge data and classified count
7	Evesham Road between junctions	July 2007	Automatic Traffic Count data
8	A435 /Miles Road/ Cheltenham Road	June 2007	Classified turning count
9	A435 /Hyde Lane/ Southam Lane	June 2007	Classified turning count
10	A435 & Racecourse	June 2007	Classified turning count
11	Access to Wingmoor Farm West Waste Management Facility	Sep 2008	Classified count 12 hour
12	Access to Malvern Business Centre	Sep 2008	Classified count 12 hour

the site. Data on the use of the site was instead obtained from site weighbridge records, which records vehicle registration and origin / destination.

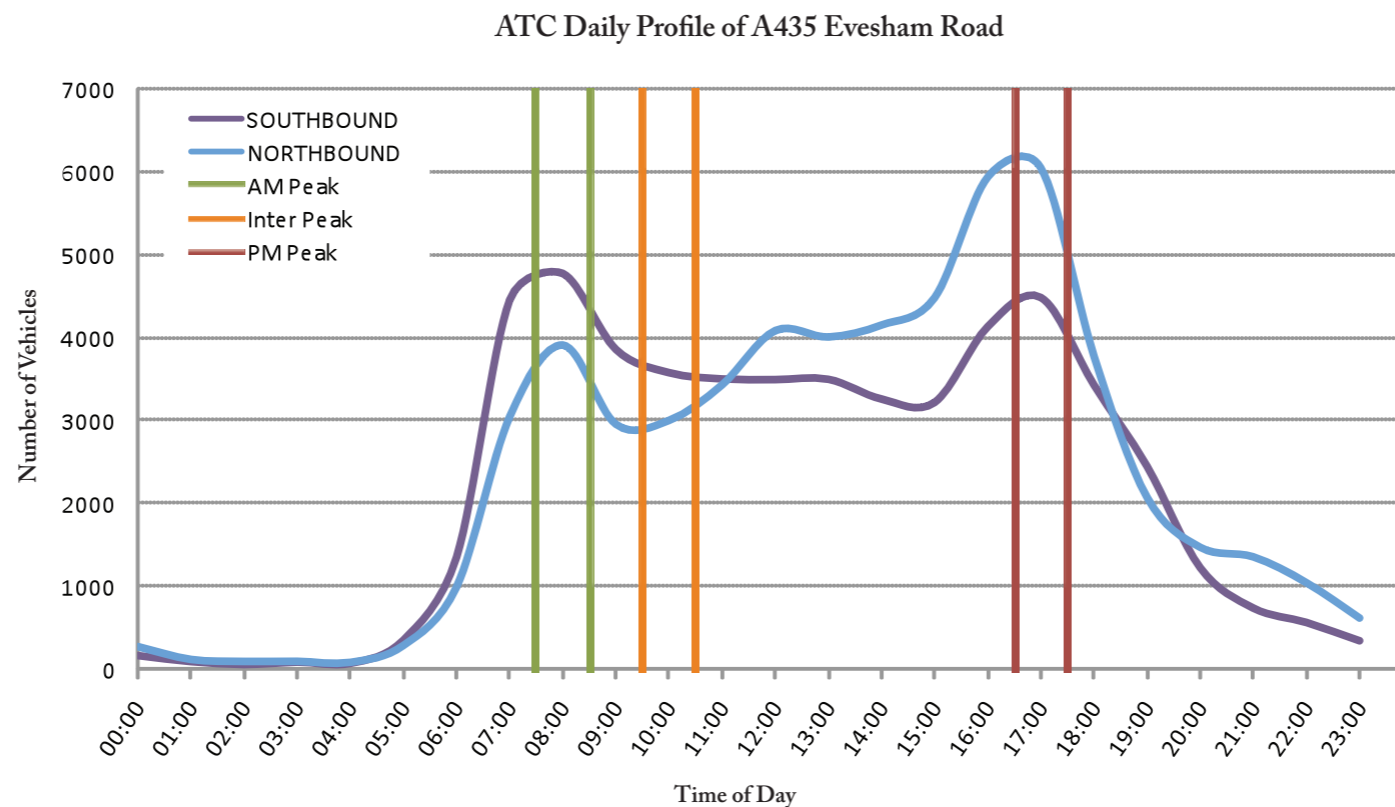
9.24 In addition to the GCC data new traffic surveys were undertaken on 16 September 2008 to identify the turning movements at various junctions along Stoke Orchard Road. A number plate recognition survey was also undertaken to provide the origin and destination data for all heavy goods vehicles which travelled through this roundabout and along Stoke Orchard Road. The weighbridge data from the site was used alongside the

number plate recognition survey to identify traffic going to the site.

9.25 A full summary of the available traffic count datasets is given in Table 9.1. The locations of each of the junctions referred to in Table 9.1 is shown on Figure 9.1.

9.26 The combination of these data sets allowed the number of vehicles attributable to the site operations to be calculated, including the distribution of site staff and the distribution of vehicles transporting waste and minerals.

Figure 9.2: Daily Traffic Flow Profile along the A435 Evesham Road



9.27 The data has been analysed to determine which peak periods should be used for the assessment. The peak periods identified are 07:30-08:30 (AM), 09:30-10:30 (Inter-peak) and 16:30-17:30 (PM). A graph showing the daily flow profile used to obtain these peak hours is shown on Figure 9.2.

Future Traffic Flows

9.28 The traffic survey information was factored up to 2009 levels to produce the base year situation and then further factored up to 2014 and 2024. Growth factors were obtained using the National Traffic Model (NTM) 2008 Forecasts (low growth) adjusted by TEMpro version 5.4 (February 2008). TEMpro is a further program providing data from the national Trip End Model and allows adjustment of the NTM data to account for specific development growth projections in the local area. The program incorporates the latest RSS plans for the Bishop's Cleeve ward. These growth factors were also checked against a new release of TEMpro 6.0 in January 2009. 'Low growth' was considered appropriate, as congestion in the peak periods generally leads to the peak being extended over a longer time period, with the additional traffic being spread out over that period. This approach is also consistent with the Gloucestershire Local Transport Plan objective of restricting future traffic growth.

9.29 The growth factors used are given in Table 9.2 along with one example of link flows along the A435 between the junction of Voxwell Lane / Stoke Orchard Road and the junction of Finlay Way and Hayfield Way.

9.30 For all future traffic flow predictions the trips attributable to existing site operations have been removed from the base traffic flows prior to the use of the growth factor. After growth was applied to background traffic the future vehicle movements from the site were added based on the routing observed in the traffic surveys.

Table 9.2 Growth factors for general traffic

Year	Factor	A435 Evesham Road	
		Southbound Flow	Northbound Flow
2007	-	869	568
2007 - 2009	1.000	869	568
2009 - 2014	1.056	918	600
2009 - 2024	1.224	1064	695

Source: 2008 National Traffic Model low growth forecast adjusted by TEMPRO 5.4 for Bishop's Cleeve

Note: Latest forecasts indicated that no growth occurred between 2007 and 2009.

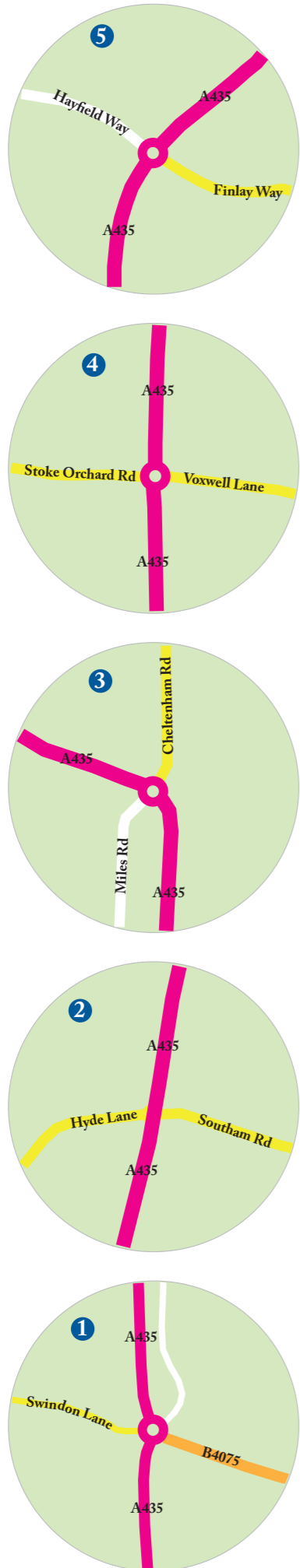


Figure 9.3 : Junctions

- The Site
- 1** Junction 1 : Cheltenham Racecourse (A435, B4075 & Swindon Lane)
- 2** Junction 2 : Southam Lane (A435, Southam Lane & Hyde Lane)
- 3** Junction 3 : Cheltenham Road (A435, Cheltenham Road & Miles Road)
- 4** Junction 4 : Voxwell Lane (A435, Voxwell Lane & Stoke Orchard Road)
- 5** Junction 5 : Finlay Way (A435, Finlay Way & Hayfield Way)



Source: Peter Brett Associates

Scale: 1:25 000

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9.31 To provide a robust assessment it has been assumed that all traffic heading either north or south along the A435 from the site would continue to travel either north or south along the A435 within the study area. For example for an HGV going north it is assumed that it travels north along the A435 from the Stoke Orchard Roundabout to the A46 junction without turning off at some point along the A435.

9.32 Some site traffic uses Stoke Orchard Road to the west of the site, travelling through Stoke Orchard village. This has been assessed in terms of the percentage increase of traffic travelling in both directions along this road as a result of the development. On the survey day in September 2008 4 'site' HGVs were observed out of a total of 17 in the am peak and 2 'site' HGVs out of a total of 18 were observed in the pm peak. This implies that 13 HGVs in the am peak and 15 HGVs in the pm peak travel through Stoke Orchard village but are not associated with Wingmoor Farm East.

9.33 For the assessment the average weight of vehicles (in tonnes) was calculated from information from Grundon including existing weighbridge data and used to convert the predicted annual tonnages from the site to vehicles per year. These figures were then divided by the number of working days to produce daily flows.

Changes as a result of the proposals

9.34 One of the earliest phases of site restoration includes the route of the existing internal site haul road which runs from the eastern site access to the current non-hazardous landfill area. It has been assumed that this route will not be available at some point in 2010. From this point onwards the eastern site access will only provide access to and from the proposed MRF. All other site traffic, including the material from the MRF going to landfill, will revert to using the western site access. The physical characteristics of the two current access junctions to the site will not be altered as a result of the proposals.

Junction Capacity and Traffic Flow Assessments

9.35 A total of five junctions within the study area have been modelled using the ARCADY computer modelling program for roundabouts and the LINSIG computer modelling program for the signalised junction. In addition the A435 / A46 roundabout at the northern end of the study area has been assessed in terms of overall increases in traffic. It has not been possible to undertake a full capacity analysis of this roundabout as classified turning counts are not available.

Table 9.3 Summary of 2009 Base Capacity Assessments

Junction	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
1	A435 North	52.5%	A435 North	36.7%	A435 South	55.1%
2	A435 North	89.5%	A435 North	55.7%	A435 North	84.2%
3	A435 North	75.6%	A435 North	40.2%	A435 South	76.9%
4	A435 North	81.7%	A435 North	43.1%	A435 South	79.7%
5	A435 North	62.5%	A435 North	36.0%	A435 South	70.6%

9.36 The location of the five junctions modelled are shown on Figure 9.43 and consist of:

- Junction 1 (Roundabout): Cheltenham Racecourse (A435, B4075 & Swindon Lane)
- Junction 2 (Signalised): Southam Lane (A435, Southam Lane & Hyde Lane)
- Junction 3 (Roundabout): Cheltenham Road (A435, Cheltenham Road & Miles Road)
- Junction 4 (Roundabout): Voxwell Lane (A435, Voxwell Lane & Stoke Orchard Road)
- Junction 5 (Roundabout): Finlay Way (A435, Finlay Way & Hayfield Way)

9.37 The design criteria for roundabouts and traffic signalised junctions is different. For roundabouts it is considered that a Ratio of Flow to Capacity (RFC) of 0.85 or below is considered as satisfactory and for a signalised junction a ratio of 0.90 is considered satisfactory.

9.38 Capacity modelling for the five junctions in the 2009 base year (including all existing traffic associated with the site) showed that there are no significant problems at present. The Ratio of Flow to Capacity (RFC) for the most congested arm of each of the five junctions are given in Table 9.3. These results provide a base situation against which the future capacity assessment results can be compared. Appendices 9.1 to 9.5 show the detailed results for each of the five junctions and also include the results for future years.

9.39 The analysis shows that all junctions are presently operating at or below capacity in the base year situation with junction 2 closest to capacity in the AM peak. As junction 2 operates under a Siemens Microprocessor Optimised Vehicle Actuation (MOVA) 'computerised' signal control system it is expected that the junction will be running at optimised levels during the AM and PM peaks. Research indicates that the MOVA control allows 3 to 5% more traffic through a signalised junction than predicted by the LINSIG program used to generate the figures given in Table 9.3.

9.40 Junction 4 is nearing capacity in the base situation with an AM peak RFC value of 81.7%. This is due to a disproportionately high flow arriving at the junction from the north along the A435.

9.41 Changes in traffic flow have been assessed using a spreadsheet 'traffic model'. The results were used in the junction capacity tests and are shown in terms of percentage changes to traffic flows in Tables 9.14, 15 and 16.

Cumulative Developments

9.42 Other developments with the potential to affect the surrounding and future baseline traffic flows have been considered as part of the assessment. These include the construction of 5,000 dwellings north Cheltenham and 1,000 dwellings to the north of Bishop's Cleeve highlighted through the regional planning process. Approximately 450 dwellings have already been permitted at Homelands Farm north of Bishop's Cleeve. The location of the further 550 dwellings is still unknown. It is understood that the TEMpro transport models referred to earlier take into account such allocations in relation to future traffic flows.

9.43 There are a number of developments proposed and permitted on the neighbouring Wingmoor Farm West Waste Management Facility and Park Waste Management Facilities development. However, it is understood that all of these developments and proposals will not increase traffic flows above those already existing in association with the sites.

Table 9.4: Fear and Intimidation Thresholds

Degree of Hazard	Average traffic flow over 18-hour day (vehicle / hour)	Total 18-hour HGV Flow	Average speed over 18-hour day (mph)
Extreme	1800+	3000+	20+
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15

Other Potential Impacts

9.44 The following possible impact areas, considered by the IEMA guidelines to be potentially significant when a new development is likely to result in a change in traffic flows, have been considered and assessed in respect of the proposals.

Severance - This is the perceived division that can occur within a community when it becomes separated by a major traffic route. The guidelines suggest that a 30%, 60% and 90% increase in traffic flow will respectively have a slight, moderate and substantial change in severance. However, allowance needs to be made for the presence of existing crossing facilities.

Driver Delay - Such delays can occur: at the site entrances; on the highways passing the site, and at key junctions on the nearby highway network. The level of vehicle delay and the value of the delay can be determined using junction or network modelling software. However, there is only likely to be a significant impact where the network is at, or close to, capacity.

Pedestrian Delay - Developments generally result in an increase in the number of vehicle and pedestrian movements. Increases in traffic levels are likely to lead to greater increases in delay to pedestrians seeking to cross roads. The guidelines recommend the assessor should use judgment to determine whether there is a significant impact to pedestrian delay. Significance should be considered in the context of the pedestrian flows and the availability of gaps in traffic for pedestrians to cross.

Pedestrian Amenity - The guidelines broadly define this as the relative pleasantness of a journey as affected by traffic flow, traffic composition, footway width and separation from traffic. A tentative threshold for changes in pedestrian amenity is where traffic flows are halved or doubled. Such a change would be considered significant.

Fear and Intimidation - This impact is dependent on the volume of traffic, its HGV composition and its proximity to people or the lack of protection caused by factors such as narrow footway widths. The guidelines suggest

thresholds based on 18-hour daily flow, 18-hour HGV flow and vehicle speeds, as shown in Table 9.4.

Accidents and Safety - Accident rates for links and junctions can be obtained and therefore the proposed increase in traffic can be used to calculate the likely impact upon road traffic accidents. Five year accident data between January 2003 and April 2008 was obtained from GCC. An analysis and interpretation of the data, together with professional judgement to assess the implications of local circumstances that could heighten or lessen risks of accidents, is included in this assessment chapter.

Dust and Dirt - Dust and dirt created by traffic can be a problem arising from the operations of certain types of development, notably quarrying and the transport of quarried materials. The impact of dust and dirt will depend, to a large extent, upon the management practices undertaken on site. An assessment of the impact of the proposals on the local highway network in respect of dust and dirt has been undertaken.

CONSULTATION

9.45 A transport scoping study, in accordance with the Guidance on Transport Assessment (DfT, 2007) was submitted to GCC. Discussions also took place with the Highways Agency regarding the scope of the assessment. However, the scoping report was not issued to the Highways Agency as they agreed that the impact on the motorway network of the proposals would be negligible. One question raised during the scoping process was the possibility of transporting material to the site by rail.

9.46 There are no existing freight terminals or sidings at the site. The use of any existing freight terminals and sidings would require onward transport of waste to the site by road. The development of a new terminal at, or adjacent, to the site would require the provision of new sidings and turnaround facilities for the trains to access the site, together with loading and unloading facilities. Adding new sidings would also require the associated re-signalling and junction works on the existing main lines to provide access to the new sidings.

9.47 As all of the space within the site is needed for waste activities, there is no space on site where such a facility could be provided. Furthermore, as the proposals are only a temporary operation at the site, the cost and disruption to the Bristol to Birmingham main line is considered likely to be prohibitive for the development of such a temporary facility. There can be no certainty that Network Rail would agree to the introduction of such a facility, nor that sufficient paths on the network could be secured such that it would be able to operate effectively.

Dependent on the frequency of its use and the way this interacts with existing passenger and freight movements, there is the additional risk that compensation payments may be required to be paid to other train operators for delays to services.

9.48 The practicalities of transporting waste would also be prohibitive to the use of rail transport. Currently facilities to bulk up waste, ready for transport by rail are not wide spread. A high proportion of the non-hazardous waste deposited at the site is derived from Cheltenham, Gloucester and the surrounding area. Waste would therefore need to be collected by road, transported to a rail terminal (such a facility may need to be created) to be bulked up for onward transport to the site by rail. The short distances involved would make this unsustainable and uneconomic. Hazardous waste deposited at the site is derived from dispersed sources across the region, and in the case of APC residues throughout the country. Bulking up such wastes would require specialised infrastructure for the purpose, which is not currently widely available.

9.49 As a result of these matters the only practical and the most sustainable and economic mode of transport to the site is by road.

IMPLICATIONS OF POLICY AND GUIDANCE

9.50 In addition to the 'Guidance on Transport Assessment' (DfT, 2007) and 'Guidelines for the Environmental Assessment of Road Traffic' (Institute of Environmental Assessment, 1993) already referred to account has also been taken of Planning Policy Guidance Note 13: Transport, and relevant local guidance and policy issued by the Highway Authority and GCC.

Draft Regional Spatial Strategy (RSS)

9.51 The emerging RSS requires transport improvements to be made to improve movement and accessibility from south Gloucester through Cheltenham and continuing up to Bishop's Cleeve. These improvements should include demand management measures, sustainable travel measures; and if necessary, targeted new infrastructure investment to unlock pinch points.

Gloucestershire Local Transport Plan (LTP2)

9.52 A principle objective of the LTP2 is "To manage, maintain and improve the transport network to meet local transport needs more effectively for all users". GCC has adopted a Lorry Strategy that seeks to route lorries onto suitable roads, avoiding sensitive areas. The main aim for

Table 9.5 Wingmoor Farm Operation Levels

	2007 Operation Levels	2009 Do Nothing	2009 Min Eng Scheme (MES)	2009 Proposed scheme	2014 Do Nothing	2014 Min Eng Scheme (MES)	2014 Proposed scheme	2024 Do Nothing / (MES)	2024 Proposed scheme
Sand and Gravel Exports	15000 tonnes	None	None	7,067 tonnes	None	None	7,067 tonnes	None	None
Clay Exports	8600 tonnes	None	None	38,400 tonnes	None	None	38,400 tonnes	None	38,400 tonnes
MRF Imports	None	None	50,000 tonnes	50,000 tonnes	None	50,000 tonnes	50,000 tonnes	None	50,000 tonnes
MRF Exports	None	None	37,500 tonnes	37,500 tonnes	None	37,500 tonnes	37,500 tonnes	None	37,500 tonnes
Non-Hazardous Waste Imports	136,000 tonnes	None	98,070 tonnes (of which 12,500 tonnes comes from MRF)	142,546 tonnes (of which 12,500 tonnes comes from MRF)	None	98,070 tonnes (of which 12,500 tonnes comes from MRF)	142,546 tonnes (of which 12,500 tonnes comes from MRF)	None	142,546 tonnes (of which 12,500 tonnes comes from MRF)
Hazardous Waste Imports	60,000 tonnes	None	62,764 tonnes	62,764 tonnes	None	62,764 tonnes	62,764 tonnes	None	62,764 tonnes
Clinical Waste	500 tonnes	None	500 tonnes	500 tonnes	None	500 tonnes	500 tonnes	None	500 tonnes

freight distribution therefore is to improve its efficiency while minimising its environmental impact. GCC has taken a three strand approach to managing freight movements consisting of: the development of a Route Strategy; the implementation of weight, height, length or access restrictions where appropriate, and active partnership and engagement with the haulage industry. The LTP2 provides an advisory freight route map which identifies the A435 as an acceptable route for heavy goods vehicles.

IMPACT IDENTIFICATION

9.53 The following section considers the traffic generation and distribution and summarises the impact of these trips on the highway network within the study area.

Trip Generation for the Do Nothing and Minimum Engineered Scheme (MES) scenarios

9.54 The site currently exports sand, gravel and clay and imports both Hazardous and Non-Hazardous waste to fill the void. Under the MES scenario, there would be no sand, gravel or clay exports, but the MRF would be operational so there would be inert material imports and recyclable material exports from that facility. By the year

2024 the MES would have been completed and the site closed, so there would be no imports or exports associated with this scenario at this point in time.

9.55 Table 9.5 outlines the current operation levels, the do nothing scenario levels, the MES scenario levels, and the future proposals operation levels.

9.56 For each of the operations to be carried out at the site a list of vehicle types and average load weight was obtained from Grundon. Table 9.6 summarises this information.

Table 9.6 Wingmoor Farm Vehicle Mix

	Smallest Vehicle (Av. Load)	Largest Vehicle (Av. Load)	Average Load
Sand and Gravel Exports	1 tonne	25 tonnes	3.56 tonnes
Clay Exports	Tipper (18T)	Artic (28T)	21.00 tonnes
Non-Hazardous Waste Imports	Van (0.8T)	Bulker (21.6T)	5.40 tonnes
Hazardous Waste Imports	Skip (4.6T)	Powder Tanker (22.6T)	15.50 tonnes

Source: Data provided by Grundon Waste Management

Table 9.7: Total Peak Period Traffic Flows for the MES Scenario

	Western Entrance		Eastern Entrance	
	Inbound	Outbound	Inbound	Outbound
2009 AM Do Nothing	0	0	0	0
2009 AM MES	8	7	15	10
2014 AM MES	8	7	15	10
2024 AM Do Nothing /MES (Site Closed)	0	0	0	0
2009 Inter-peak Do Nothing	0	0	0	0
2009 Inter-peak MES	12	10	15	12
2014 Inter-peak MES	12	10	15	12
2024 Inter-peak Do Nothing / MES (Site Closed)	0	0	0	0
2009 PM Do Nothing	0	0	0	0
2009 PM MES	4	14	2	10
2014 PM MES	4	14	2	10
2024 PM Do Nothing / MES (Site Closed)	0	0	0	0

Table 9.8: Total 12 hr Traffic Flows for the MES Scenario (07:00 – 19:00)

	Western Entrance		Eastern Entrance	
	Inbound	Outbound	Inbound	Outbound
2009 Do Nothing 12 hr - Car	0	0	0	0
- LGV	0	0	0	0
- HGV	0	0	0	0
- Total	0	0	0	0
2014 MES 12 hr - Car	20	42	15	19
- LGV	3	2	1	2
- HGV	52	51	86	79
- Total	75	95	102	100
2024 MES 12 hr - Car	0	0	0	0
- LGV	0	0	0	0
- HGV	0	0	0	0
- Total	0	0	0	0

Table 9.9: Total Peak Period Traffic Flows for the Proposals

	Western Entrance		Eastern Entrance	
	Inbound	Outbound	Inbound	Outbound
2009 AM Do Nothing	0	0	0	0
2009 AM Proposal	12	10	23	16
2014 AM Proposal	12	10	23	16
2024 AM Proposal	11	9	20	14
2009 Inter-peak Do Nothing	0	0	0	0
2009 Inter-peak Proposal	20	15	21	17
2014 Inter-peak Proposal	20	15	21	17
2024 Inter-peak Proposal	17	14	20	16
2009 PM Do Nothing	0	0	0	0
2009 PM Proposal	8	23	2	14
2014 PM Proposal	8	23	2	14
2024 PM Proposal	5	20	2	13

Table 9.10 : Total 12 hr Traffic Flows for the Proposals (07:00 - 19:00)

	Western Entrance		Eastern Entrance	
	Inbound	Outbound	Inbound	Outbound
2009 Do Nothing 12 hr - Car	0	0	0	0
- LGV	0	0	0	0
- HGV	0	0	0	0
- Total	0	0	0	0
2014 Proposal 12 hr - Car	29	61	22	27
- LGV	3	2	1	2
- HGV	73	72	121	111
- Total	105	135	144	140
2024 Proposal 12 hr - Car	28	58	20	26
- LGV	3	2	1	2
- HGV	72	70	119	109
- Total	103	130	140	137

9.57 The total tonnage and average load per vehicle figures have been used to work out the annual number of vehicles leaving and arriving at the site under the different assessment scenarios.

9.58 Traffic predicted to be generated under the MES scenario at the two site entrances is shown in Table 9.7 and 9.8 for the AM, PM and inter-peak hours for 2009, 2014 and 2024 respectively. Background traffic flows have been factored up by the ratios given in Table 9.2

9.59 The recent traffic surveys indicate that at present over the 12 hour day 162 HGVs enter the site and 153 leave the site. In the 2014 'MES' situation flows are slightly lower than the present day traffic movements with 138 HGVs entering and 130 HGVs leaving. The main difference compared to the present operation is the reduced import per year of non-hazardous waste and no sand, gravel and clay extraction.

9.60 In respect of the proposals the predicted peak period traffic flows from the two site entrances are shown in Table 9.9. This flow data is provided for the full 12 hours in Table 9.10. This represents data between 07:00 and 19:00. The sites hours of operation begin slightly prior to this with some staff arriving as early as 06:00 or just before. As the results shown in the tables are based on the observed 2008 traffic surveys there is a consequent difference between the number of cars entering and leaving the site as many of the cars arrived prior to the start of the survey.

9.61 In 2014 flows from the proposals are slightly higher than the present day traffic movements with 183 HGVs entering and 194 HGVs leaving. This represents

an increase of 20% compared with the present day and is mainly related to the operation of the Materials Recovery Facility (MRF). In the autumn of 2008 a total of 57 permanent staff were employed at the site by Grundon and a further 14 staff were employed on a contract basis, giving a maximum total staff number of 71 in the base year.

9.62 The MRF will require a further 5 permanent staff and 20 agency staff. It is therefore estimated that the total number of staff on the site as a result of the proposals will be 96 over the course of the day. Car trips are also anticipated to be generated by visitors to the site. The total two-way car trips surveyed in 2008 entering and leaving the site over the course of the day was 123. The total car trips per day as a result of the proposals is estimated at 139 in 2014 and 132 in 2024 representing a maximum increase of just 13%. These trips have been applied to the future cases of 2014 and 2024.

9.63 Traffic flows as a result of the proposals for acoustic assessment (18 hour) and air quality assessment (24 hour) purposes have been calculated for three of the arms of the roundabout junction between Stoke Orchard Road and the A435 (junction 4) and are given in Table 9.11.

Junction Capacity Assessments

9.64 The capacities of each of the five junctions have been assessed in respect of the MES scenario in 2014. The results, shown in Table 9.12 demonstrate that there are no significant capacity issues at junction 1. Junction 2 is predicted to be operating at or slightly over capacity by 2014. Junction 3 is predicted to be operating just below the guideline maximum capacity of 85%. Junction 4 was

Table 9.11 : Traffic Factors for Noise & Air Quality

	Acoustics 18 HR Flows								
	2009 Do Nothing			2024 Do Nothing / MES			2024 Proposed Scheme		
	Total Flow	Total HGV	HGV %	Total Flow	Total HGV	HGV %	Total Flow	Total HGV	HGV %
Stoke Orchard Rd	8616	503	5.83%	10560	615	5.82%	10937	902	8.24%
A435 North	13779	168	1.22%	16816	205	1.22%	16928	301	1.78%
A435 South	16267	335	2.06%	19907	410	2.06%	20150	601	2.98%
	Air Quality 24 HR Flows								
	2009 Do Nothing			2024 Do Nothing / MES			2024 Proposed Scheme		
	Total Flow	Total HGV	HGV %	Total Flow	Total HGV	HGV %	Total Flow	Total HGV	HGV %
Stoke Orchard Rd	8735	519	5.94%	10706	635	5.94%	11083	922	8.32%
A435 North	13969	173	1.24%	17048	212	1.24%	17160	307	1.79%
A435 South	16491	346	2.10%	20181	424	2.10%	20425	615	3.01%

Sources: Traffic Counts by Count on Us (September 2008)

ATC Data provided by GCC

Traffic Counts provided by GCC

Generic daily profiles from Road Research Laboratory report LR 295

Table 9.12: Summary of 2014 MES Scenario Capacity Assessment

Junction	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
1	A435 North	54.5%	A435 North	37.9%	A435 South	57.8%
2	A435 North	92.4%	A435 North	62.0%	A435 North	85.8%
3	A435 North	78.8%	A435 North	41.7%	A435 South	79.9%
4	A435 North	86.8%	A435 North	45.1%	A435 South	84.8%
5	A435 North	64.7%	A435 North	37.1%	A435 South	73.6%

Table 9.13: Summary of 2024 Do Nothing/MES Capacity Assessment

Junction	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
1	A435 North	63.2%	A435 North	43.5%	A435 South	71.0%
2	A435 North	104.7%	A435 North	68.9%	A435 South	98.5%
3	A435 North	91.7%	A435 North	47.7%	A435 South	92.4%
4	A435 North	103.2%	A435 North	51.2%	A435 South	99.3%
5	A435 North	75.6%	A435 North	41.9%	A435 South	86.7%

Table 9.14: Percentage Increase Assessment Year 1 (2009)

	2009 Do Nothing	2009 MES Position	2009 Proposed Scheme	Additional % Increase due to MES Scenario	Additional % Increase due to Proposed Scheme
South of A46/A435 Roundabout					
AM	873	881	884	0.9	0.3
Inter-Peak	436	448	453	2.8	1.1
PM	698	700	700	0.3	0.0
North of A435 Racecourse Roundabout					
AM	1578	1598	1605	1.3	0.4
Inter-Peak	976	997	1005	2.2	0.8
PM	1638	1647	1650	0.5	0.2
West of A435 Stoke Orchard Road/Voxwell Rd Roundabout					
AM	940	970	984	3.2	1.4
Inter-Peak	485	520	535	7.2	2.9
PM	946	961	967	1.6	0.6
West of Cory (Wingmoor Farm West) Entrance					
AM	679	689	695	1.5	0.9
Inter-Peak	300	315	322	5.0	2.2
PM	738	754	762	2.2	1.1

already nearing capacity in the base year (see Table 9.3) and the assessment shows that in 2014 the northern arm of the A435 will be just below 90% of capacity. Junction 5 is below capacity at all times of the day.

9.65 As previously mentioned by 2024 the MES scheme would be complete. The results of the capacity assessments for each of the five junctions under the MES scenario for 2024 therefore only takes account of 'background' traffic growth. The results are shown in Table 9.13.

9.66 There are no significant capacity issues at junction 1. Junction 2 is predicted to be operating over capacity in the AM and PM peaks. By 2024 junction 3 is predicted to be operating just over the guideline maximum capacity of 85% and junction 4 is predicted to be just over 100% of capacity in the AM peak and just below 100% in the PM peak. Junction 5 is just over the guideline 85% in the evening peak but is still within acceptable standards.

9.67 In order to assess the impact of the proposals the key junctions were subjected to junction capacity tests, the results of which are explained in further detail in the following sections. For the roundabout junctions (Junctions 1, 3, 4 and 5) ARCADY 6 has been used for assessment purposes whereas for junction 2 (a signalised junction) a LINSIG capacity assessment has been undertaken. As turning count data is not available for the

A435 / A46 junction at the northern end of the study area it has not been possible to undertake a capacity test. However, entry and exit flows are available and have allowed the effect of the proposals on this junction to be determined in terms of percentage increase.

9.68 Capacity tests were not undertaken at the site accesses as future flows are not significantly greater than those currently taking place with the present operation. Both junctions operate efficiently at present and will continue to do so with the proposed scheme.

9.69 Table 9.14 shows the percentage increase in two-way trips at four locations for the MES and the proposals in 2009. Table 9.15 and 9.16 show similar information but relating to 2014 and 2024.

9.70 The results for 2014 in Table 9.15 demonstrate that the maximum increase of the proposals occurs in the inter-peak period with a maximum increase of just 2.7% compared with the MES scenario. In the peak periods increases are generally less than 1%. To the west of Wingmoor Farm West inter-peak flows are predicted to increase by 7 vehicles per hour for the comparison of the Proposals with the MES Scenario. When compared with the 2008 survey (with the existing waste site in operation) the Proposals result in an increase of 18 vehicles per hour (5.6%) to the west of Wingmoor Farm West.

Table 9.15 Percentage Increase Assessment 2014 Compared to 2009 Do Nothing

	2009 Do Nothing	2014 Do Nothing	2009 MES Position	2014 Proposed Scheme	Background % Growth in Traffic	Additional % Increase due to MES Scenario	Additional % Increase due to Proposed Scheme
South of A46/A435 Roundabout							
AM	873	922	930	933	5.6	0.9	0.3
Inter-Peak	436	460	472	477	5.5	2.6	1.1
PM	698	737	739	739	5.6	0.3	0.0
North of A435 Racecourse Roundabout							
AM	1578	1666	1686	1693	5.6	1.2	0.4
Inter-Peak	976	1033	1052	1060	5.8	1.8	0.8
PM	1638	1730	1739	1742	5.6	0.5	0.2
West of A435 Stoke Orchard Road/Voxwell Rd Roundabout							
AM	940	993	1023	1037	5.6	3.0	1.4
Inter-Peak	485	512	547	562	5.6	6.8	2.7
PM	946	999	1014	1020	5.6	1.5	0.6
West of Cory (Wingmoor Farm West) Entrance							
AM	679	717	727	733	5.6	1.4	0.8
Inter-Peak	300	317	332	339	5.7	4.7	2.1
PM	738	779	795	804	5.6	2.1	1.1

Table 9.16 Percentage Increase Assessment 2024 Compared to 2009 Do Nothing

	2009 Do Nothing	2024 Do Nothing/ MES Position	2024 Proposed Scheme	Additional % Background % Growth in Traffic due to	Additional % Increase due to Proposed Scheme
South of A46/A435 Roundabout					
AM	873	1068	1079	22.3	1.0
Inter-Peak	436	534	549	22.5	2.8
PM	698	854	856	22.3	0.2
North of A435 Racecourse Roundabout					
AM	1578	1931	1956	22.4	1.3
Inter-Peak	976	1197	1222	22.6	2.1
PM	1638	2005	2016	22.4	0.5
West of A435 Stoke Orchard Road/Voxwell Rd Roundabout					
AM	940	1150	1192	22.3	3.7
Inter-Peak	485	594	640	22.5	7.7
PM	946	1158	1177	22.4	1.6
West of Cory (Wingmoor Farm West) Entrance					
AM	679	831	845	22.4	1.7
Inter-Peak	300	367	387	22.3	5.4
PM	738	903	925	22.4	2.4

Table 9.17: Capacity Assessment of Junction 1

Option	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
2009 Existing	A435 North	52.5%	A435 North	36.7%	A435 South	55.1%
2014 Do Nothing	A435 North	53.3%	A435 North	36.9%	A435 South	57.3%
2014 MES	A435 North	54.5%	A435 North	37.9%	A435 South	57.8%
2014 Proposal	A435 North	54.6%	A435 North	38.4%	A435 South	57.9%
2024 Do Nothing	A435 North	63.2%	A435 North	43.5%	A435 South	71.0%
2024 Proposal	A435 North	64.7%	A435 North	45.1%	A435 South	71.5%

9.71 The IEMA guidelines state that a percentage increase of 30% should be considered significant and this should be reduced to 10% in sensitive areas (such as hospitals, churches, schools and historical buildings). The 2014 results in Table 9.15 show that there is no significant impact as the maximum increase from the proposals compared with the Do Nothing is just 9.8% on Stoke Orchard Road to the west of the A435 roundabout.

9.72 The results in Table 9.16 demonstrate that in 2024 the maximum increase generated by the proposals would again occur in the inter-peak period with a maximum increase of 2.8% on the A435 and 7.7% on Stoke Orchard Road. The 2.8% figure represents one vehicle every four minutes. In the AM peak the increase on Stoke Orchard Road is less than one vehicle per minute and in the evening peak one vehicle every three minutes.

9.73 The results show that in 2024 there is slightly less impact in comparison with the 2014 position, with the maximum increase from the proposals compared with the Do Nothing being reduced to 7.7% on Stoke Orchard Road to the west of the A435 roundabout.

Junction 1: Cheltenham Racecourse (A435, B4075 & Swindon Lane)

9.74 The results of the capacity assessment for this roundabout are given in Appendix 9.1 and in summary in Table 9.17. This junction does not have any significant issues in terms of junction capacity on any arm or in any peak hour. Based on the results of this assessment there is no significant impact from traffic generated by the proposals on this junction.

Junction 2 : Southam Lane (A435, Southam Lane & Hyde Lane)

9.75 The results of the capacity assessment for this signalised junction are given in Appendix 9.2 and in summary in Table 9.18. This signalised junction operates under a MOVA unit. This method of signal control takes account of varying traffic flows in real time and optimises the green time accordingly. Therefore the actual results achieved by the system are likely to be better than those modelled by software such as LINSIG. In order to take account of this the Linsig modelled results for the AM peak flows have been factored down by 3%. This is in line with published MOVA saturation flow rate improvements which range between 3-5%. As the inter-peak and PM peak are well below capacity the 3% adjustment was not applied.

Table 9.18: LINSIG Capacity Assessment of Junction 2

Option	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
2009 Existing	A435 North	89.5%	A435 North	55.7%	A435 North	84.2%
2014 Do Nothing	A435 North	82.1%	A435 South	50.6%	Hyde Lane	80.7%
2014 MES	A435 North	92.4%	A435 North	62.0%	A435 North	85.8%
2014 Proposal	A435 North	93.1%	Hyde Lane	62.8%	A435 North	85.9%
2024 Do Nothing	A435 North	104.7%	A435 North	68.9%	A435 North	98.5%
2024 Proposal	A435 North	107.3%	A435 North	72.3%	A435 North	99.4%

Table 9.19: Capacity Assessment of Junction 3 Roundabout

Option	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
2009 Existing	A435 North	75.6%	A435 North	40.2%	A435 South	76.9%
2014 Do Nothing	A435 North	77.5%	A435 North	40.2%	A435 South	79.6%
2014 MES	A435 North	78.8%	A435 North	41.7%	A435 South	79.9%
2014 Proposal	A435 North	79.0%	A435 North	42.0%	A435 South	80.0%
2024 Do Nothing	A435 North	91.7%	A435 North	47.7%	A435 South	92.4%
2024 Proposal	A435 North	93.3%	A435 North	49.7%	A435 South	92.6%

9.76 This junction is already close to capacity on the A435 northern approach in 2009 during both the AM and PM peaks. In the 2014 situation there is little difference between the MES scheme and the proposals with the AM peak showing a rise of just 0.7% in the Ratio of Flow to Capacity.

9.77 In the 2024 situation the 'Do Nothing' case is showing that the junction will be over capacity in the AM peak on the A435 North with a RFC of 104.7% and in the PM peak will be at 98.5% of capacity. These predicted levels of overcapacity would rise by 2.6% in the AM and 0.9% in the PM with the proposals.

9.78 As the junction is already predicted to be overcapacity at this point in time it is not considered that the slight worsening in the ratio of flow to capacity as a result of the proposals will be significant.

Junction 3: Cheltenham Road (A435, Cheltenham Road & Miles Road)

9.79 The results of the capacity assessment for this roundabout are given in Appendix 9.3 and in summary in Table 9.19. This junction does not have any significant issues in terms of junction capacity on any arm or in any peak hour. Based on the results of this assessment there is no significant impact from traffic from the proposals on this junction.

9.80 In the 2014 AM peak cases this junction is operating just below the 85% 'design capacity'. The maximum increase attributable to the proposals over the MES scenario is just 0.2% in the AM peak and 0.1% in the PM peak. In 2024 the junction is predicted to be just over 90% of capacity in both the AM and PM peaks in the 'Do Nothing' scenario. The maximum increase which may be attributed to the proposals is 1.6% in the AM peak and 0.2% in the PM peak.

9.81 From Appendix 9.3 it can be seen that in 2024 the traffic generated by the proposals adds 4 seconds delay per vehicle to the A435 North in the AM peak and 0.6 seconds delay per vehicle to the A435 South in the PM peak when compared to the 2024 Do Nothing. Based on the results of this assessment the significance of traffic generated by the proposals is negligible and the level of impact is low.

Junction 4: Voxwell Lane (A435, Voxwell Lane & Stoke Orchard Road)

9.82 The results of the capacity assessment for this roundabout are given in Appendix 9.4 and in summary in Table 9.20. In 2014 this junction is operating around 90% of capacity under both the MES scenario and with the proposals. The maximum increase which may be attributed to traffic from the proposals over the MES position is 0.8% in the AM and 0.2% in the PM.

Table 9.20: Capacity Assessment Junction 4

Option	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
2009 Existing	A435 North	81.7%	A435 North	44.1%	A435 South	79.7%
2014 Do Nothing	A435 North	85.3%	A435 North	43.5%	A435 South	83.6%
2014 MES	A435 North	86.8%	A435 North	45.1%	A435 South	84.8%
2014 Proposal	A435 North	87.6%	A435 North	45.8%	A435 South	85.0%
2024 Do Nothing	A435 North	103.2%	A435 North	51.2%	A435 South	99.3%
2024 Proposal	A435 North	105.7%	A435 North	53.5%	A435 South	100.6%

9.83 In 2024 without the proposals the junction would be operating just over 100% of capacity in the AM peak and just below 100% in the PM peak. The maximum increase which may be attributed to traffic from the proposals is 2.5% in the AM and 1.3% in the PM. Based on the relative effect of traffic from the proposals the significance of traffic generated by the proposals is negligible and the level of impact is low with a medium term timescale as the site operation will cease at some point after 2028/2029.

Junction 5: Finlay Way (A435, Finlay Way & Hayfield Way)

9.84 The results of the capacity assessment for this roundabout are given in Appendix 9.5 and in summary in Table 9.21. The results show that this junction will operate satisfactorily in all cases with the PM peak just going over the 85% 'design capacity' in 2024 in both the do nothing scenario and as a result of the proposals. The maximum increase which may be attributed to traffic from the proposals is only 0.7% in the AM and 0.2% in the PM.

9.85 Based on the results of this assessment the significance of traffic from the proposals is negligible and the level of impact is low with a medium term timescale, as the site operation will cease at 2028 / 2029.

Severance

9.86 In respect of severance the increase in traffic flows as a result of the proposals are shown in Tables 9.14, 15 and 16 are well below the levels of increase indicated in the IEMA guidelines where severance impacts are likely to occur. The guidelines suggest that increases above 30% are significant and the tables indicate that all comparisons of the proposals with the Do Nothing situation are below 10%

Driver Delay

9.87 Delays to non-development traffic can occur on the network due to additional traffic generated by a

Table 9.21: Capacity Assessment of Junction 5

Option	AM Peak		Inter-Peak		PM Peak	
	Arm	RFC	Arm	RFC	Arm	RFC
2009 Existing	A435 North	62.5%	A435 North	36.0%	A435 South	770.6%
2014 Do Nothing	A435 North	64.3%	A435 North	35.8%	A435 South	73.5%
2014 MES	A435 North	64.7%	A435 North	37.1%	A435 South	73.6%
2014 Proposal	A435 North	65.0%	A435 North	37.4%	A435 South	73.7%
2024 Do Nothing	A435 North	75.6%	A435 North	41.9%	A435 South	86.7%
2024 Proposal	A435 North	76.3%	A435 North	43.5%	A435 South	86.9%

development. The IEMA guidelines note that these additional delays are only likely to be significant when the traffic on the network is already at, or close to, the capacity of the system. Appendices 9.1 to 9.5 show that the increases in predicted delay are very small and indicate that the majority of potential problems will be related to the growth in general traffic levels rather than increases in traffic attributable to the proposals

Pedestrian Delay Assessment

9.88 The IEMA guidelines recommend that assessors use their judgement to determine whether pedestrian delay is a significant impact. Pedestrian counts were not undertaken as there is no footway on the south side of Stoke Orchard Road at the Bishops Cleeve end, and therefore no obvious reason for pedestrians to cross Stoke Orchard Road. The only identifiable crossing point is to the rugby club but this is an actual club rather than a recreation ground and therefore it is unlikely that significant numbers of pedestrians walk to the club during the sites hours of operation. Based on the limited number of pedestrians crossing Stoke Orchard Road it is considered that there would not be an adverse impact from the site in terms of pedestrian delay.

9.89 On the A435 Table 9.16 shows that traffic flows will increase by about 22% due to background growth with an additional 2 to 3% growth in the inter-peak related to the proposals. The proposal will add approximately 1 vehicle every 4 minutes to the north of Bishops Cleeve and 1 every 2 minutes to the south, neither of which will significantly affect pedestrian movements.

Pedestrian / Cyclist Amenity Assessment

9.90 Pedestrian amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width and separation from traffic. The IEMA guidelines note that changes in pedestrian amenity may be considered to be significant where the traffic is halved or

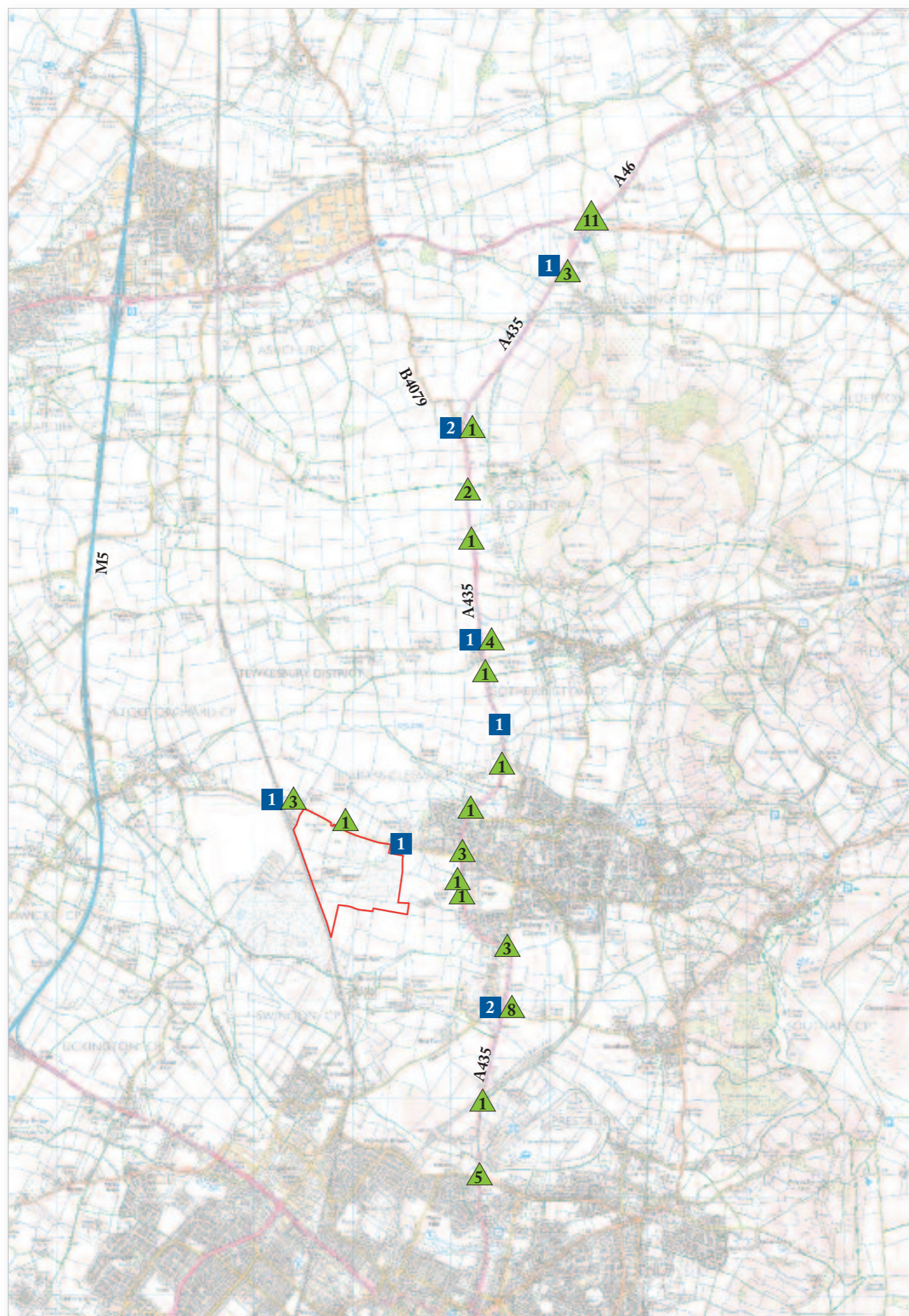


Figure 9.4 : Accident location plan

□ The Site

▲ Accident locations

▲ Slight (51)

■ Serious (9)



Source. Peter Brett Associates

Scale. 1:50 000

Based upon the Ordnance Survey scale map with the permission of The Controller of Her Majesty's Stationery Office
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doubled. As already mentioned increases in flow will be much lower than these levels but will be highest along Stoke Orchard Road.

9.91 Lit urban footways are located just east of the eastern site entrance along Stoke Orchard Road leading to combined footways / cycle ways located on both sides of the A435. The residential estate located off Stoke Orchard Road is separated from the main residential area of Bishop's Cleeve by the A435 and in order to create a safe pedestrian link there is a pelican crossing on the A435 between junctions 4 and 5. All footways within the residential area are of sufficient width and those on the A435 have sufficient separation from the main carriageway to be safely utilised despite the volumes of traffic which use the road.

9.92 There is no history of pedestrian accidents along Stoke Orchard Road. HGVs are mainly destined for the industrial estate, the site or Wingmoor Farm West Waste Management Facility. Most HGV traffic does not therefore turn off the A435 until it has passed the residential junction of Stoke Orchard Road and Stella Way. From the assessment undertaken it is not envisaged that the proposed traffic increases as a result of the proposals will have an adverse impact on pedestrian amenity.

Fear and Intimidation Assessment

9.93 The IEMA Guidelines state that the issue is a complex problem which cannot be assessed by quantitative means alone. However, a level of impact can be assigned based on the combination of the average vehicles per hour, total heavy goods vehicles and the average speed over an 18 hour day.

9.94 Due to the levels of HGVs which operate on Stoke Orchard Road it was considered appropriate to test this road in terms of fear and intimidation. On the A435 the levels of traffic increase are much less and the character of the road is based on its role as a main north/south route from Cheltenham to the A46. It was not considered that the small increases on this route would adversely affect pedestrians.

9.95 Although speed surveys were not undertaken, site observations on Stoke Orchard Road suggest that speeds are not excessive. It is considered that there should be a low impact in terms of speed. Traffic data has been used to calculate the average number of vehicles per hour (18 hour = 06:00 - 24:00). This calculation shows average flows on Stoke Orchard Road of 479 vehicles per hour in the 2009 Do Nothing, 587 per hour in the 'Do Nothing'

2024 scenario and 608 per hour in 2024 with the proposals. The IEMA guideline levels begin with moderate at 600 - 1200 vehicles per hour. Whilst the predictions for the proposals in 2024 are just on the borderline of this category the additional traffic related to the proposals is just 21 vehicles per hour (1 vehicle every 3 minutes) based on the 18 hour period.

9.96 Total HGV movements over the 18 hour period on Stoke Orchard Road have been calculated as 503 vehicles per day in the 2009 Do Nothing, 615 per day in the 'Do Nothing' 2024 scenario and 902 per day in 2024 with the proposals. The IEMA guideline levels begin with moderate at 1000 HGVs per 18 Hour day. As the predicted flows are below this level it is considered that there is a low impact in terms of HGV traffic flows.

9.97 There is only one footway on the north side of Stoke Orchard Road and at the Bishops Cleeve end it is segregated from the main carriageway. Based on the IEMA guidelines, the flow rates and the general layout of the road in terms of residential areas it is considered that there would not be a significant adverse impact from the site in terms of fear and intimidation as a result of the proposals.

114 Accidents and Safety

9.98 Full accident data for the past 5 years was obtained from GCC for the length of the A435 (including junctions with A46 and B4075) and Stoke Orchard Road from the A435 to the railway line. A plot showing the location of the 60 accident locations is shown on Figure 9.4. A number of accidents have occurred in the same locations and it is therefore difficult to show these individually.

9.99 Overall the data shows a number of accidents along the A435 but not a high level and none readily identify the type of vehicles involved, although one at the junction of the A435 and A46 does refer to a tractor and trailer. The majority of the descriptions point towards 'shunting' collisions on approaches to junctions and problems with visibility.

9.100 One accident is located at one of the site accesses and occurred in October 2004. It was caused by a driver avoiding a rabbit and so is not attributable to the operation of the site. Another accident occurred at the humpback bridge west of the site in May 2006. The accident is recorded as a minor collision by two 7½ ton lorries which tried to cross at the same time. There is no information on the ownership of either lorry but the western site entrance is designed in such a way as to

encourage lorries from the site to primarily travel eastbound towards the A435. Therefore it seems likely that this accident was not related to the operation of the site. One Accident was caused by a vehicle turning right into the industrial estate to the east of the site and again is not attributed to the operations at the site.

9.101 Based on the five year accident data there is no evidence that the historic operations at the site have had any adverse impact in terms of road safety on the local network. Tables 9.15 and 9.16 show the percentage traffic increase from the proposals in 2014 and 2024. When compared with the Do Nothing situation the overall maximum increase in inter-peak hour traffic flows resulting from the proposals is 9.8% along Stoke Orchard Road in 2014 and 7.7% in 2024. In the AM peak periods these increases are just 4.4% and 3.7% respectively. These additional trips represent a maximum increase in flow along the A435 of 3.7% and 2.8% for the 2014 and 2024 inter-peak periods and 1.6% and 1.3% for the same situations in the AM peak. Based on the lack of any present evidence of accidents attributed to vehicles associated with the historic operation of the site it is concluded that there will be no significant adverse impacts of the proposals in terms of road safety.

Dust and Dirt Assessment

9.102 The proposals provide facilities to clean vehicles on arrival or departure to minimise the impact of dust and dirt on the local environment and adjacent highway. The MRF includes a wash-down area and wheel wash facilities at the eastern entrance. Wheel wash facilities are also provided at the western site access. In addition to this road sweeping of both the site access roads and the approaches to the site on Stoke Orchard Road will be undertaken as necessary. Furthermore, no lorries shall be allowed to enter or leave the MRF un-sheeted.

9.103 As a result of these measures it is considered that there would not be an adverse impact on the local highway network from the site in terms of dust and dirt during its operation.

MITIGATION MEASURES

Travel Plan

9.104 Staff numbers at the site are predicted to rise as a result of the proposals and therefore there is potential for some of the predicted trips to be made via more sustainable modes of travel. A Site Travel Plan will be

developed for the site to address this. The objectives of the Plan will be:

- to increase staff and visitor awareness of the potential to travel by more environmentally friendly modes and the advantages of this both for their own health and the environment in general; and
- to introduce a package of physical and management measures that will assist travel by modes other than the private car.

9.105 In respect of staff working at the site the Travel Plan will provide details on:

- the promotion of a car sharing scheme;
- the possibility of a staff mini-bus;
- the provision of information and advice concerning safe pedestrian and cycle routes to the site;
- the provision of changing and showering facilities with lockers;
- the provision of secure cycle parking facilities; and
- the display of prominent up to date public transport information in staff areas.

9.106 The Travel Plan will require staff to complete periodic travel surveys to collect data on travel choices and behaviour. The data that is collected will be used to promote sustainable travel to the site and to establish future mode split targets for the development.

9.107 In order to encourage the use of public transport it is considered that financial contributions to a number of physical improvement measures may be appropriate. Following discussions with the Planning and Highway Authorities the Travel Plan it is envisaged that the Travel Plan will include an indication of the type of measures that could be made to assist the use of non car modes of travel. The measures that could be considered include:

- Improvements to bus shelters
- Funding of additional street lights
- Improvements to footways.

9.108 The Travel Plan will be implemented and monitored in full consultation with the local planning and highway authorities.

Routing Agreement

9.109 GCC's LTP2 provides recommended goods vehicle routes through the county. In order to comply with this heavy goods vehicles using the site will be encouraged to travel to and from the site via the A435, which is identified as an acceptable goods vehicle route

in the LTP2. To encourage heavy goods vehicles to exit both entrances by turning right, painted right turn arrows will be added to each entrance with the abbreviation 'HGV' underneath. Further to this a blue sign will be placed at the site exits to read, 'No left turn for vehicles over 17 tonnes'.

Dust and Dirt

9.110 Whilst facilities are already in place for wheel cleaning, and will remain in place for the duration of the proposals at both the site entrances, this is not always 100% effective. A regular programme of road cleaning will therefore continue to be implemented for the site entrances.

SIGNIFICANCE OF THE RESIDUAL IMPACTS

9.111 Taking into account the analysis of effects in this chapter and the mitigation measures outlined above, a final assessment of residual traffic and transport impacts resulting from the proposals is provided in Table 9.22.

9.112 Overall, it is considered that the proposals and possible increases in traffic associated with them in the future case would have an insignificant residual impact in terms of traffic and transport.

CUMULATIVE EFFECTS

9.113 The impact of new housing and employment identified through the emerging regional planning process has been assessed through junction capacity results as such future developments are included in the background traffic growth factors.

9.114 General indications from junction modelling within the study area indicate that the highway network will be getting busier in the 2024 future case and that junctions 2, 3 and 4 may be nearing capacity. This will affect both the am and pm peaks.

9.115 It is not possible to calculate the net impact of future development as its effect is combined with the general growth in traffic that will occur due to the long term increase in personal prosperity. In light of this it cannot be concluded that the impact of new housing and employment in terms of traffic and transport will be significant.

9.116 There is also an application to modify the operation at Wingmoor Farm West by the site operator

Table 9.22 : Summary of Residual Impact (Operational Phase)

Potential Impact	Timescale of the Impact	Spatial Extent of the Impact	Magnitude of the Impact	Mitigation	Residual Impact
Highway and Junction Capacity	Long Term	Local	Negligible	Travel Plan to encourage travel outside of peak hours	Minor significance
Driver Delays	Long Term	Local	Negligible	Travel Plan to encourage travel by other modes	Minor significance
Road Safety	Long Term	Local	Negligible	Travel Plan including possible contributions towards new street lighting and footways if required	Insignificant
Pedestrian /Cyclist Amenity	Long Term	Local	Negligible	Travel Plan including possible contributions towards new street lighting if required	Insignificant
Dust & Dirt	Long Term	Local	Negligible	Wheel washing is carried out on all HGVs & regular road cleaning	Insignificant
Public Rights of Way	Long Term	Local	No Impact	None	Insignificant

Cory. The latest predictions from the consultant producing this application argues that the proposals will not increase traffic movements or impact on the highway network and therefore the impact from this application has been assumed not to be significant.

SUMMARY

9.117 This chapter has assessed in detail the potential impacts of the development proposals on Stoke Orchard Road and the A435 to the north and south of Bishops Cleeve.

9.118 In terms of two-way HGV movements the proposals would generate approximately 377 trips per day. This compares with 315 trips from the present 2009 operation and 268 from the Minimum Engineered Scheme (MES). The application site is located in close proximity to the A435 primary road which via connection with the A46 to the north provides access to the M5 motorway. The motorway can also be accessed via various routes through Cheltenham to the south. The greater majority of vehicles access the site from the east via Bishops Cleeve with a small number travelling from the west via Stoke Orchard village.

9.119 Junction capacity tests have been undertaken for 5 junctions along the A435 testing the situation in 2009, 2014 and 2024. The assessments indicate that junctions 2, 3 and 4 will be nearing capacity in 2024 based on a

combination of general traffic growth and the planned housing and employment developments in the RSS. The additional impacts resulting from the proposals are negligible and do not warrant any physical improvements.

9.120 Capacity tests were not undertaken at the site accesses as future flows are not significantly greater than those taking place with the present operation. Both junctions operate efficiently at present and will continue to do so with the proposed scheme.

9.121 The assessment concludes that traffic generated by the proposals will not have significant adverse impacts in respect of severance, driver delay, pedestrian delay, pedestrian / cyclist amenity, fear and intimidation, accidents and safety and dust and dirt.

9.122 A comprehensive Travel Plan will be developed in conjunction with the Planning and Highway Authorities and would promote car sharing between staff and encourage the use of non car modes where practicable. Financial contributions may also be appropriate within the TP for measures such as improvements to bus shelters, provision of additional street lights and improvements to footways.

9.123 In light of the mitigation measures proposed it is considered that the proposed development would have an insignificant residual impact on the highway network and is acceptable in traffic and transport terms.

